

## The systematic position of *Wockia* HEINEMANN, 1870, and related genera (Lepidoptera : Ditrysia : Yponomeutidae auct.) (\*)

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### Summary

The adult, larva and pupa of *Wockia asperipunctella* (BRUAND, [1851]), the type-species of *Wockia* HEINEMANN, 1870, are redescribed. A new family, the Urodidae, is erected for *Wockia* and the related genera, *Urodus* HERRICH-SCHÄFFER, [1854] and *Spiladarcha* MEYRICK, 1913. The family is diagnosed, its monophyly demonstrated and its systematic position discussed. The nominal genera and species included are listed. *Pygmoerates* MEYRICK, 1932, is a new junior synonym of *Urodus* HERRICH-SCHÄFFER, [1854].

### Zusammenfassung

Die Imago, Larva und Pupa von *Wockia asperipunctella* (BRUAND, [1851]), der Typus von *Wockia* HEINEMANN, 1870, sind neu beschrieben. Eine neue Familie, die Urodidae, ist für *Wockia* und die verwandten Gattungen *Urodus* HERRICH-SCHÄFFER, [1854] und *Spiladarcha* MEYRICK, 1913 errichtet. Die Familie ist beschrieben, ihre Monophylie demonstriert und ihre systematische Stelle diskutiert. Die nominal Gattungen und Arten der neuen Familie sind aufgelistet. *Pygmoerates* MEYRICK, 1932, ist ein neues jüngeres Synonym von *Urodus* HERRICH-SCHÄFFER, [1854].

### Introduction

In studying the phylogeny of the superfamily Yponomeutoidea I have found that the genus *Wockia* HEINEMANN, 1870, and its closest relatives, *Urodus* HERRICH-SCHÄFFER, [1854], and *Spiladarcha* MEYRICK, 1913, which are usually placed in the family Yponomeutidae, are not true yponomeutoids. The genera were excluded from the Yponomeutoidea as an informal genus group, the *Urodus* group, but they were not placed in any named family or superfamily, pending further information on the group (KYRKI 1984). The immature stages of *Wockia asperipunctella* (BRUAND, [1851]) have now been

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examined, and the species can be redescribed. This redescription and the examination of a number of *Urodus* and *Spiladarcha* species has shown that the genus group cannot be placed in any ditrysian family so far described, but a new family is needed. This new family is described, its monophyly demonstrated and its systematic position within the Ditrysia discussed.

### Redescription of *Wockia asperipunctella* (BRUAND, [1851])

ADULT (Figs. 1-5, 24)

Wingspan 17-18 mm. Head with thick scaling, scales upright on posterior margin, directed anteriorly on vertex and downwards on frons, but almost without medially directed scales in front of and above the eyes. Labial palpi porrected, fairly short. Median segment somewhat thickened by scaling, apical segment blunt, with a group of sensilla basiconica on the surface near the apex. Maxillary palpi minute, 1-segmented. Pilifers prominent. Proboscies unscaled, provided with prominent sensillae in the apical half. Compound eyes with scattered microsetae between the facets. Ocelli and chaetosemata absent. Antenna lamellate in the male, almost filiform in the female. Scape on the anterior side with pecten consisting of about 10 narrow scales and outside this a short-scale tooth. Flagellum scaled dorsally and provided with long sensillae laterally and ventrally, especially in the male. Dorsal scales of each segment in a basal and apical incomplete whorl.

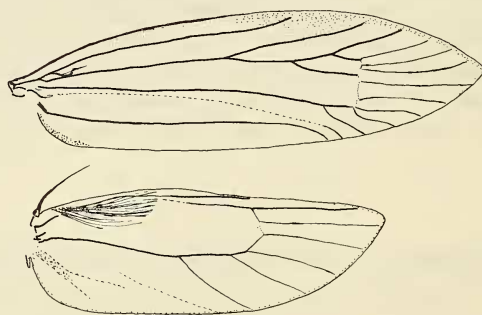
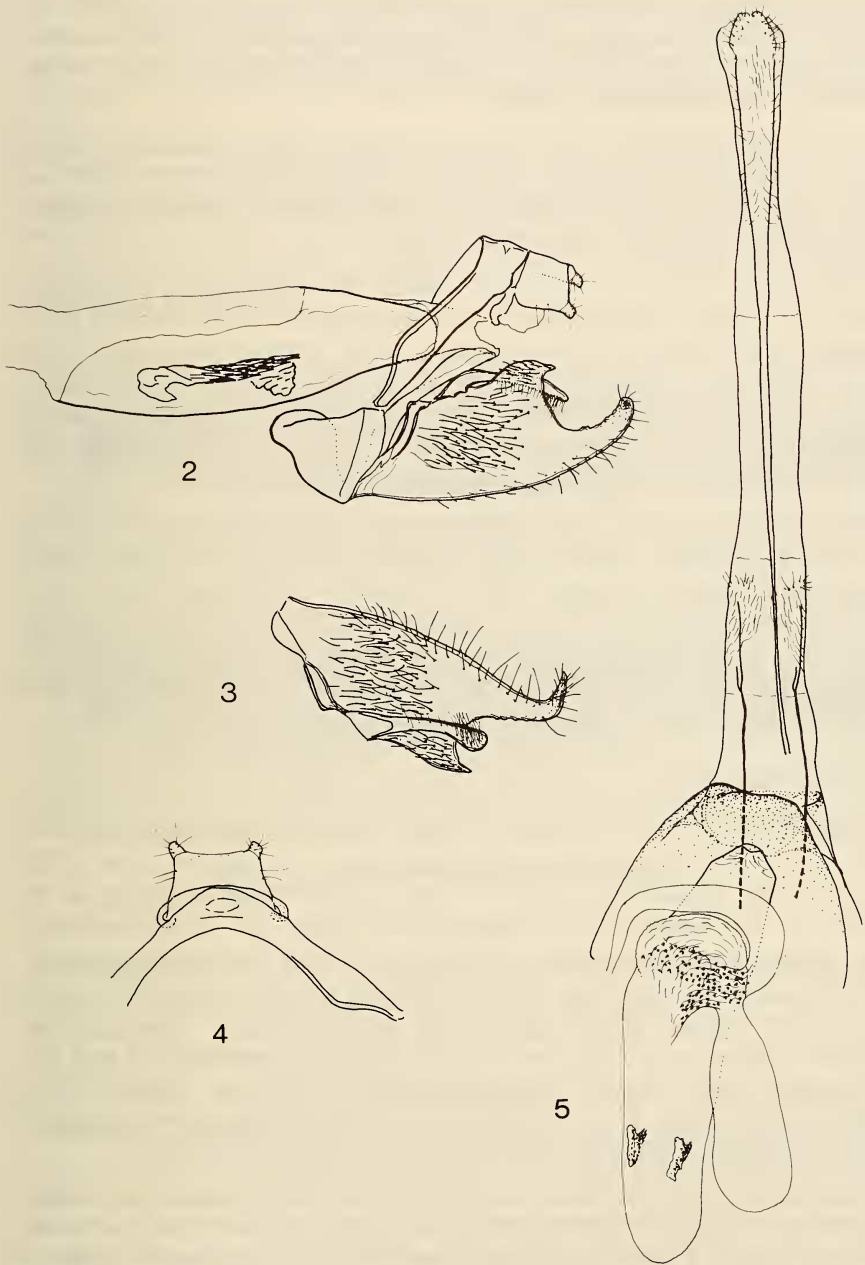


Fig. 1. Wing venation of *Wockia asperipunctella* (BRD.), ♂.

Legs somewhat rough-scaled, except hind tibia, which are hairy dorsally and ventrally. Epiphysis present, spurs 0-2-4.

Forewing grey, with raised black scale-tufts at about 1/3 and numerous scattered black dots. Hindwing grey, with a yellowish hairpencil in the base below the folded anterior margin in the male. Venation as in Fig. 1. Forewing



Figs. 2-5. Genitalic structures of *Wockia asperipunctella* (BRD.). — 2. Male genitalia in lateral view. — 3. Left valva in dorsal view. — 4. Uncus and tegumen in dorsal view. — 5. Female genitalia.

with pterostigma. Costa arched. Chorda strong. Vein R5 to costa. Discal cell bent downwards. All radial, medial and antero-cubital veins present, separate. Basal part of media absent and posterior cubitus reduced in both wings. Female with three frenular bristles.

Thorax and abdomen without tympanal organs. Second abdominal sternite with sclerotized anterolateral processes and reduced sternal rods, which are not contiguous with the apodemes (Fig. 24). Male 8th abdominal segment unmodified, with simple sternite and tergite.

Male genitalia (Figs. 2-4). Aedeagus large, with a sclerotized plate and a group of strongly united cornuti. Tegumen and double-pointed uncus short, jointed to each other. Gnathos reduced to small remnants on the sides of the uncus base. No sclerotized transtilla or transtilla processes in the valvae. Juxta an elongated plate. Anellus membranous. Valva strong, with hooked sacculus, pointed broad process at the upper margin and a digitiform process on the base of the costa. Vinculum bulbed medially.

Female genitalia (Fig. 5) of the ditrysian type. Ostium below the hind margin of the 7th sternite. Ductus bursae almost as wide as the bursa, evenly sclerotized. Bursa copulatrix with two signa in the anterior part and a conspicuous, dentate swelling at the junction of the ductus bursae and ductus seminalis. Bulla seminalis well developed, membranous. Anterior apophyses long, with a reduced ventral branch. Posterior apophyses and abdominal segments very long, forming a telescopic ovipositor.

#### LARVA (Figs. 6-17).

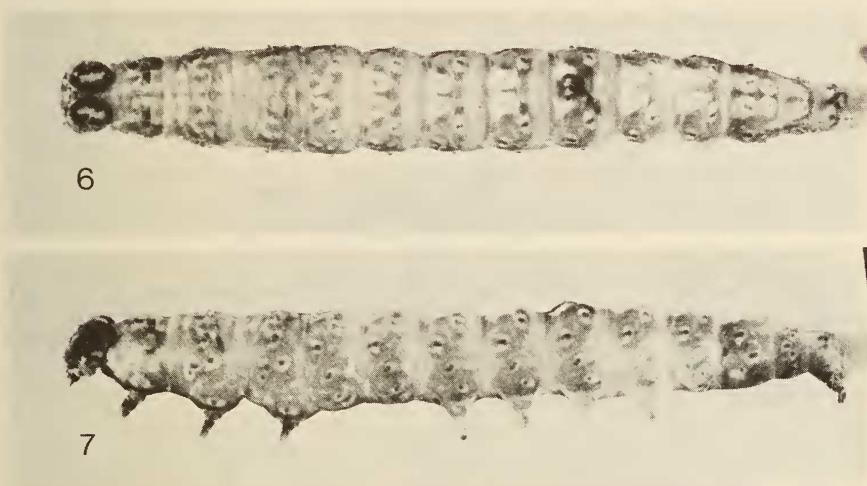
Length 11.5-13.5 mm (last instar, inflated larvae). Head dark brown, with light spots below the ocelli, on the frontoclypeus and on the halves of the vertex. Body greyish brown with ill-defined yellowish grey markings on the sides of the prothorax and abdominal segments 5-7. A characteristic, protruding, dark fuscous spot on the dorsum of the abdominal segment 5. Subdorsal, most lateral and some dorsal pinaculi dark, others of the body colour, all surrounded by a more or less distinct light spot. These spots are most conspicuous on the dorsum of the abdominal segments 2-4 and 6-8, where they form a more or less distinct light dorsal stripe. Pinaculi D1 on abdominal segments 8 and 9 slightly protruded. Prothoracic and anal plates not sclerotized. Cuticula of head, body and thoracic legs spinose.

Head with normal ditrysian macro and micro-setae. Anterior and ocellar setae in a triangle. O<sub>2</sub> just behind the 1st ocellus. So<sub>2</sub> very close to the two lowest ocelli and So<sub>3</sub> in the middle between So<sub>2</sub> and the ventral margin of the epicranium behind the puncture So<sub>a</sub> fairly close to the antenna. Punctures A<sub>a</sub> and V<sub>a</sub> seem to be absent. In frontal view setae V<sub>2</sub> and V<sub>3</sub> remain behind



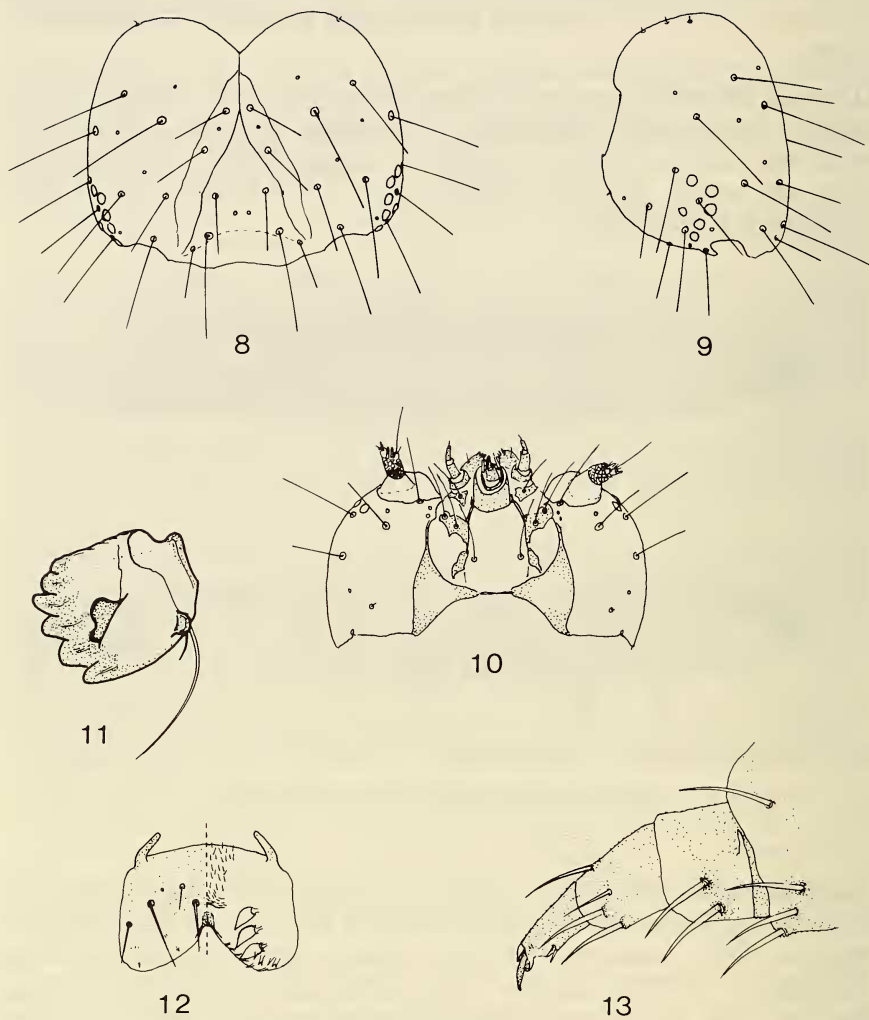
the rounded halves of the cranium. Second segment of the antenna reticulated. Mandible strong, with six lateral teeth and a double inner tooth. Labrum weakly sclerotized on its anterior and lateral margins, with six pairs of setae, of which the two most anterior ones are reduced and extremely short.

Thoracic legs with strong ventral setae on the coxa, femur and tibia. Dorsal setae of the meso- and metathoracic tarsi modified and claws fairly straight, with basal loop, but prothoracic claws more curved. Ventral and anal prolegs long and narrow, medially constricted, with 9-12 uniordinal and uniserial crochets in a mesoseries.

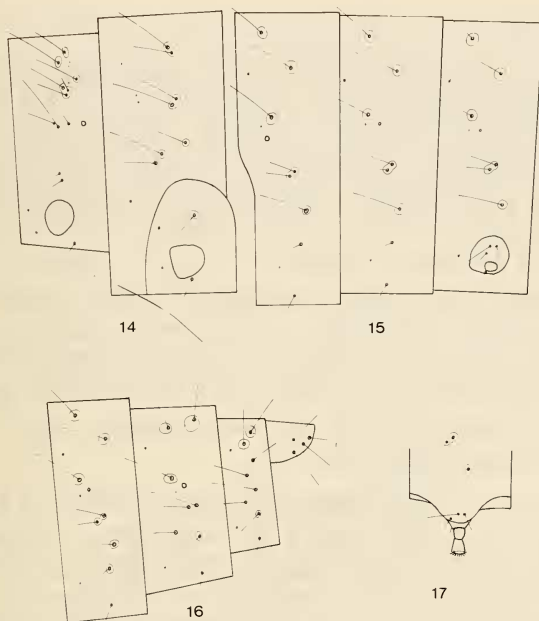


Figs. 6, 7. Larva of *Wockia asperipunctella* (BRD.).

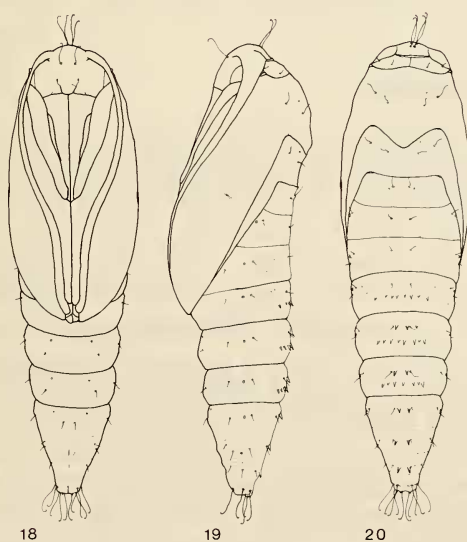
Body chaetotaxy. Prothorax : L-group trisetose and SV-group bisetose. D1 close to and posterolateral to XD1. SD1 and SD2 close to and ventroposterior to XD2. Lower SD seta thin, hairlike. MXD1 absent. Meso- and metathorax : D1 + D2 and SD1 + SD2 on common pinaculi. SV1, VI and two MV setae on a large leg-bearing swelling. Only one MD seta on the metathorax. Abdomen : spiracles small on segments 1 and 8 and very small on 2-7. SD2 setae minute, anterodorsal of the spiracle on segment 1 and anterior to the spiracle on segments 2-8. L1 and L2 on a common pinaculum. L3 ventroposterior to L1 and L2 on segments 1-7 but ventroanterior to them on segment 8. One subventral seta on segments 1, 2 and 7-9. SV1 is almost as high as L3 on segment 8. Subventral and ventral setae on conspicuous, proleg-bearing swellings on segments 3-6.



Figs. 8-13. Larval head and leg structures of *Wockia asperipunctella* (BRD.). — 8-10. Head chaetotaxy; frontal, lateral and ventral view. — 11. Right mandible from inside. — 12. Labrum; external and internal structures. — 13. Left mesothoracic leg.



Figs. 14-17. Larval chaetotaxy of *Wockia asperipunctella* (BRD.). 14. Pro- and mesothorax. — 15. Abdominal segments 1-3. — 16. Abdominal segments 7-9 and anal shield. — 17. Proleg and adjacent setae of abdominal segment 5 in lateral view.



Figs. 18-20. Female pupa of *Wockia asperipunctella* (BRD.) in ventral, lateral and dorsal view.

PUPA (Figs. 18-20).

Length 6-7 mm. Pupal skin well sclerotized, light brown with dark brown pattern. Mandibular lobes and pits of anterior tentorial arms distinct. Labial palpus, maxillary palpus and coxae concealed. A narrow stripe of fore femora exposed. Fore leg extends to the tip of the proboscis, and the antenna almost to the apex of the forewing. Wings joined to abdominal segments 1-3. Abdominal segments 3-7 movable at the posterior margin in the male and segments 3-6 in the female. Segments 5-9 with an anterior row of two or occasionally three tergal spines and segments 4-6 with a posterior row of 3-9 spines. Occasionally a rudimentary anterior row on segment 4 or posterior row on segment 7. In addition to the rows of coarse tergal spines, a number of very fine spines occur on segments 2-5. Frons with two pairs of strong, hooked setae, clypeus with one pair and cremaster with 5 pairs. Body chaetotaxy otherwise as illustrated.

Pupal vertex, and pro- and mesothorax are split medially at the eclosion of the adult. They also separate slightly from each other. The basal half of the antenna loosens from the underlying structures but remains attached to the frons. The "lateral eye-pieces" (sensu MOSHER, 1916) are connected to the halves of the vertex. The apical part of the antenna does not loosen from the wings or legs. The legs also remain attached to each other and to the proboscis. The suture between the eye + mandibular lobe and foreleg + proboscis is split, but the frontoclypeus with antennae and mandibular lobes remains attached to the middle part of the base of the proboscis by the labrum.

#### BIOLOGY AND DISTRIBUTION

Flight period in northern Europe from the end of May to the beginning of July and larval period in July-August. The species occurs in two generations a year in southern Europe, the first flying from the end of April to the beginning of June and the second from the end of July to the beginning of September, with the larvae feeding in June-July and September-October respectively (CHRÉTIEN, 1905). The larva feeds on *Populus tremula* L. and *P. nigra* L., and also on several *Salix* species, e.g. *S. elaeagnos* Scop. (BROWN, 1895 ; CHRÉTIEN, 1905). In northern Europe the main food plant is *Populus tremula*. The larva lives freely on the leaves, skeletonizing them when small and later feeding from the edges (CHRÉTIEN, 1905). It pupates in an open network cocoon, which is open at both ends so that the larval skin can be thrown away through the posterior opening. The pupa hibernates and the anterior part protrudes out of the cocoon in the spring at adult eclosion.

*Wockia asperipunctella* has a wide distribution in central and northern Europe, although it has not been recorded north of 62° N.L. (Fig. 21). The

map has been compiled from records published by BRUAND ([1851]), HEINEMANN (1870), BROWN (1895), RAGONOT (1895), CHRÉTIEN (1905), ORSTADIUS (1932), KROGERUS (1943), KLIMESCH (1961), KUUSIK (1962), KYRKI (1978), ŠULCS & ŠULCS (1978), ZAGULAJEV (1981), GUSTAFSSON (1980) and SVENSSON (1982). In central Europe the species seems to avoid lowland localities to some degree. It inhabits both dry, warm and open places and also moist shore or forest biotopes, where its food plants grow in abundance.

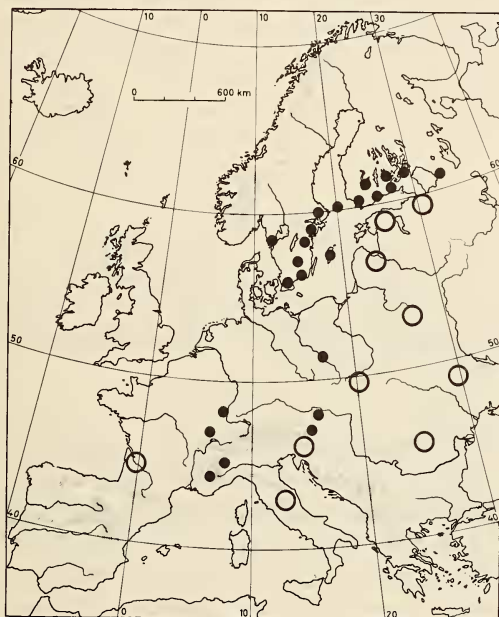


Fig. 21. Distribution of *Wockia asperipunctella* (BRD.) in Europe. Open circles : locality not precisely given.

### **Urodidae, new family**

Type-genus : *Urodus* HERRICH-SCHÄFFER, [1854].

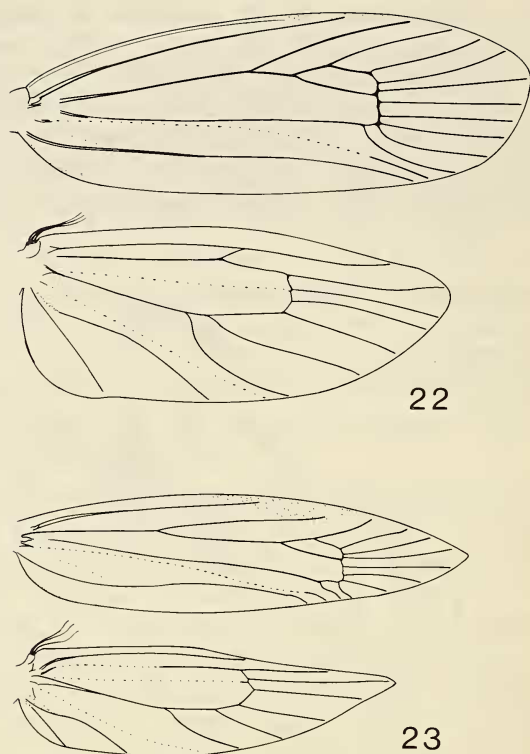
The genus *Urodus* HERRICH-SCHÄFFER has been chosen as the type-genus for the family, since it is a prominent, large genus from the main distribution range of the group.

#### **ADULT**

(Figs. 1-5, 22-25).

(For additional figures see CLARKE, 1965, pls. 190, 198, 199 and 200).





Figs. 22, 23. Wing venation. — 22. *Urodus* sp., ♀. — 23. *Spiladarcha* sp., ♀.

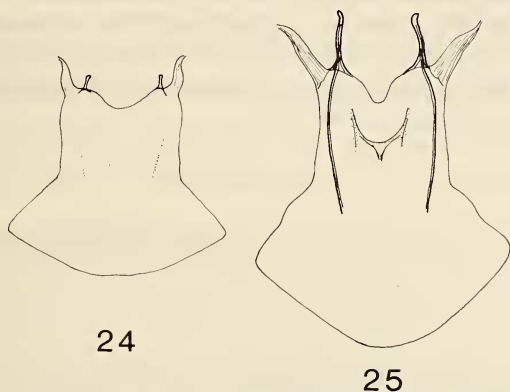
Wing span 11-37 mm. Usually dark grey or brownish moths often with blue or violet gloss. Forewing sometimes with black erect scale tufts or light ochreous markings.

Head with anteriorly directed, more or less appressed scales. Ocelli and chaetosemata absent. Proboscis unscaled, provided with prominent sensillae. Maxillary palpi reduced. Antenna lamellate, especially in the male.

Forewing varying from narrow to broad oval in shape, costa strongly arched. Pterostigma present, sometimes obscure. Distal cell often bent downwards in outer half. Chorda strong. Vein R5 to costa or apex. CuP reduced, basally parallel to CuA. CuA1 and CuA2 strongly bent. 1A + 2A long, without basal fork (base of 1A absent). Hindwing usually with costal hairpencil in male, all veins present, separate, or occasionally CuA2 out of base of CuA1.

Hind tibia with long hair scales. Spurs 0-2-4. Fore tibia with epiphysis.

Abdomen. Second abdominal sternite with sclerotized elongated anterior corners. Sternal rods variable, either well developed, reduced or absent (Figs. 24, 25). Tympanal organs absent. One or two pairs of invaginated coremata may be present below the 8th tergite and occasionally also a pair in the lateral pleura of the second segment in the male abdomen.



Figs. 24, 25. Adult abdominal sternite II. — 24. *Wockia asperipunctella* (BRD.). — 25. *Urodus* sp.

Male genitalia usually symmetrical (asymmetrical in *Spiladarcha* MEYRICK). Valva strong, hooked, usually with a slender process from the base of the costa. Juxta a plate. No sclerotized transtilla. Uncus double pointed, varying in form from a short triangular or quadrangular plate to a very long, curved hook. Gnathos present or reduced. Aedeagus often curved, slender to stout, usually with cornuti and sometimes with sclerotized external teeth. Subscaphium usually not prominent, occasionally spinose.

Female genitalia. Apophyses very long. Ostium on or behind the 7th sternite, occasionally asymmetrical. Ductus bursae more or less sclerotized, varying from long and narrow to short and wide. Bursa with one or occasionally two pairs of signa and sometimes with sclerotizations at the junction of the ductus seminalis.

#### LARVA

Apart from the larva of *Wockia asperipunctella* described above, only larvae of *Urodus parvula* EDWARDS have been examined. These agree well with those of *W. asperipunctella* in most details. The specialized proleg structure, the unusual position of setae L3 and SV1 on the 8th abdominal segment, the absence of MXD1 on the prothorax and the single MD seta on the

metathorax are good diagnostic characters for the family. The most conspicuous difference between the two species examined was found in the head chaetotaxy. The Af group consists of two setae and one puncture in *Wockia*, as in the other ditrysian larvae with primary setae only. In *Urodus parvula* the Af puncture seems to be transformed into a tactile seta. Without further material it cannot be said whether this trisetose condition is a specific or a generic character. The trisetose Af group seems to be unique to the lower Ditrysia. It was said to be diagnostic for the family Acrolepiidae (WERNER, 1958), but all the acrolepiid larvae examined by the author have proved to possess only two Af setae.

#### PUPA

Only the pupa of *Wockia asperipunctella* was examined (see above), and thus the diagnostic characters of urodid pupae in general cannot be given.

#### BIOLOGY

Oviposition not observed, but the long ovipositor seems to be specialized for laying eggs in crevices. Larval biology of most species unknown, but known larvae live freely on leaves of broad-leaved trees. Pupation in a large meshed cocoon which is usually stalked. The last larval skin is thrown away through the posterior opening of the cocoon. The pupa protrudes from the cocoon before emergence of the adult. Some species (e.g. *Wockia asperipunctella*) may have one or two generations a year depending on the local climate, others (e.g. *Urodus parvula* (EDWARDS)) a very long, continuous flight period (FROST 1972). The overwintering stage of *Wockia asperipunctella*, the only well-known species from temperate climates is the pupa.

#### DISTRIBUTION

Most species of the Urodidae occur in South and Central America, from Argentina in the south as far north as Mexico and Cuba, with one species occurring even in the southern United States. The only species described outside this area is the European *Wockia asperipunctella*, but undescribed species are also known to exist in the oriental region, e.g. Sri Lanka and Borneo (KYRKI, unpubl.).

#### Monophyly of the Urodidae

Until more is known about the phylogeny of the ditrysian Lepidoptera, it is difficult to verify which characters are autapomorphic at different levels of the ditrysian phylogeny; The monophyly of the Urodidae can be demonstrated by several characters, however. The antenna is distinctly lamellate and the

hindwing provided with a characteristic basal hairpencil in the male. These characters are not unparalleled in the Ditrysia, but more or less similar structures seem to be confined to subordinate groups, e.g. genera within well-founded families. Basal hairpencils for instance, are found on the hindwings of some species of the Gelechiidae (FORBES, 1923), Ethmiidae (SATTler, 1967), Xyloryctidae (COMMON, 1970), Cosmopterygidae and Tineidae (ZIMMERMANn, 1978). The long, slender, medially constricted larval prolegs with crochets in a mesoseries and the position of setae L3 and SV1 on the 8th abdominal segment can be mentioned as additional autapomorphies of the Urodidae. These characters are not known to be paralleled in other groups of ditrysian Lepidoptera, but this may be due to our poor knowledge of the variation in larval characters in many ditrysian families.

### **Systematic position of the Urodidae**

Most nominal taxa of the Urodidae have been originally described in the Yponomeutidae (as Hyponomeutidae) and later authors have usually referred them to that family (e.g. LERAUT, 1980 ; HEPPNER & DUCKWORTH, 1983 ; HEPPNER, 1984). The urodids were excluded from the Yponomeutidae as an informal genus group, the *Urodus* group, since they possess tortricoid abdominal articulation, three female frenular bristles, crochets of ventral prolegs in mesoseries, larval abdominal seta L1 and L2 on a common pinaculum and a pupa with abdominal tergal spines (KYRKI, 1984). Additional characters which do not fit with the variation normally found in the Yponomeutoidea are : unmodified 8th abdominal segment in the male ; vein R5 to costa (or apex) in the forewing ; median uncus, which is jointed to the tegumen ; valvae without basal processes (anterior transtilla processes) ; pupal labial and maxillary palpi concealed ; pupa protrudes from the cocoon at adult eclosion. Thus another superfamilial assignment has to be found for the urodids.

The ditrysian female genitalia, pupal abdominal structure (dorsal spines) and mode of splitting of the pupal cuticula at adult eclosion indicate that the family Urodidae belongs to one of those superfamilies of the suborder Ditrysia, which are characterized by a primitive pupal structure and protrusion behaviour at adult eclosion. These superfamilies are the Tineoidea, Cossioidea, Tortricoidea, Castnioidea, Zygaenoidea, Sesiioidea and Schreckensteinioidea.

The elongated, sclerotized anterior corners of the abdominal sternite II of adult Urodids and the strongly united sheets of pupal appendages exclude the Urodidae from the Tineoidea as currently diagnosed (see KYRKI, 1984). In the other superfamilies mentioned above, the sternite II possesses elongated anterior corners, as it does in the Urodidae.



The urodids differ in respect of a number of diagnostic characters from the superfamilies Cossioidea, Tortricioidea, Castnioidea and Zygaenoidea as defined e.g. by COMMON (1970). The absence of ocelli and chaetosemata ; lamellate antenna ; advanced venation (M-stem absent, CuP reduced, R5 to costa or apex, 1A + 2A without basal fork) ; free-living larva with crochets in mesoseries but body without secondary setae and head not retracted into the prothorax ; pupa with appendages fairly firmly united together, coxae and labial and maxillary palpi concealed and cremaster provided with strong, hooked setae, is a combination of characters which excludes the Urodidae from each of the four superfamilies.

The monophyly of the Sesiioidea has not been convincingly demonstrated (the presumed synapomorphies of sesiid families listed by HEPPNER (1982) being either plesiomorphic characters in the Ditrysia, e.g. the trisetose L-group of the larval prothorax and the well-developed, large pupal maxillary palpi, or probable synapomorphies of a group of ditrysiian superfamilies, e.g. the tortricoid abdominal apodemes), and thus the urodids were also compared separately with each of the sesiid families. No specialized, advanced characters common to the Urodidae and the sesiid families or the Sesiioidea were found, the similarities being either symplesiomorphies or reductions which occur in many ditrysiian superfamilies, and consequently the Urodidae cannot be placed in the Sesiioidea.

The superfamily Schreckensteiniioidea was erected by MINET (1983) to include a single family with only one, highly specialized genus, *Schreckensteinia* HÜBNER, [1825]. The urodids have some interesting similarities to the Schreckensteiniidae, such as a free-living larva which has long ventral prolegs, the large meshed cocoon from which the larval skin is thrown out after pupation and the reduced number of pupal dorsal abdominal spines. The long ventral prolegs and the large meshed cocoon are characters which are paralleled in several ditrysiian families, and are therefore not good indicators of a close relationship. The reduction in the number of pupal dorsal spines has also followed a somewhat different course in the Schreckensteiniidae and Urodidae, the former no longer having any spines in posterior rows. It does not seem reasonable, therefore, without further evidence of their relationship, to unite the two highly specialized families, which also differ from each other in numerous characters that are usually considered important in higher classifications, e.g. the arrangement of the crochets of the larval prolegs, the separating of sheets of pupal appendages from each other at eclosion of the adult and the running of vein R5 to the margin of the forewing. I prefer to leave the Urodidae in the Ditrysia as a family of uncertain affinities, which in cataloguing practice can be placed tentatively in a superfamily of its own in the neighbourhood of the Schreckensteiniioidea.



## Nominal taxa of the family

### 1. NOMINAL GENERA

**Anchimacheta** WALSINGHAM, 1914 : 323.

Type-species : *Anchimacheta capnodes* WALSINGHAM, 1914 : 324, by original designation.

Currently considered to be a junior subjective synonym of *Spiladarcha* MEYRICK, 1913 (MEYRICK 1931 : 173) although listed as valid genus by HEPPNER (1984 : 56). *A. capnodes* WALSINGHAM, 1914, is currently considered to be a junior subjective synonym of *Anchimacheta iodes* WALSINGHAM 1914 : 323 by action as a first reviser of MEYRICK (1931 : 174).

**Paratiquadra** WALSINGHAM, 1897 : 116.

Type-species : *Paratiquadra forficulella* WALSINGHAM, 1897 : 116, by original designation and monotypy.

Junior subjective synonym of *Trichostibas* ZELLER, 1863 (MEYRICK 1914 : 35); currently considered a junior subjective synonym of *Urodus* HERRICH-SCHÄFFER, [1854] (HEPPNER & DUCKWORTH 1983 : 27).

**Patula** BRUAND, 1851 : 50.

Type-species : *Patula asperipunctella* BRUAND, 1851 : 50 by monotypy.

*Patula* BRUAND, 1851, is a junior homonym of *Patula* HELD, 1837 (Mollusca). It is currently considered to be a senior subjective synonym of *Wockia* HEINEMANN, 1870, which is used as the subjective replacement name (RAGONOT 1895 : ccvi).

**Pexicnemidia** MÖSCHLER, 1890 : 337.

Type-species : *Pexicnemidia mirella* MÖSCHLER, 1890 : 338 by monotypy.

*Pexicnemidia* MÖSCHLER, 1890 was recently transferred from Tineidae to synonymy of *Urodus* HERRICH-SCHÄFFER, [1854] following examination of the type-species by D. R. DAVIS (HEPPNER 1984 : 56, 60).

**Pygmocrates** MEYRICK, 1932 : 283.

Type-species : *Pygmocrates lissopeda* MEYRICK, 1932 : 283 by monotypy.

*Pygmocrates* MEYRICK, 1932, is a new junior synonym of *Urodus* HERRICH-SCHÄFFER, [1854]. *Pygmocrates lissopeda* MEYRICK, 1932, and some species of *Urodus*, e.g. *sympiestis* MEYRICK 1925, figured by CLARKE (1965 : 402, 403), may represent a separate subgenus of the genus *Urodus*, but until the

whole genus has been revised, it is best to treat *Pygmoctrates* simply as a new junior synonym of *Urodus*.

**Spiladarcha** MEYRICK, 1913 : 139.

Type-species : *Spiladarcha derelicta* MEYRICK, 1913 : 139 by monotypy.

See also : *Anchimacheta* WALSINGHAM, 1914.

**Trichostibas** ZELLER, 1863 : 150.

Type-species : *Trichostibas fumosa* ZELLER, 1863 : 150 by monotypy.

Currently considered to be a junior subjective synonym of *Urodus* HERRICH-SCHÄFFER, [1854] (WALSINGHAM 1914 : 332).

**Urodus** HERRICH-SCHÄFFER, [1854] : wrapper, pl. 42 figs. 219, 220.

Type-species : *Urodus monura* HERRICH-SCHÄFFER, [1854] : wrapper, pl. 42, fig. 219 by subsequent designation by KIRBY, 1892 : 112.

See also : *Trichostibas* ZELLER, 1863, *Paratiquadra* WALSINGHAM, 1897, *Pexicnemidia* MÖSCHLER, 1890 and *Pygmoctrates* MEYRICK, 1932.

**Wockea** REUTTI, 1898 : 291.

Type-species : *Wockia funebrella* HEINEMANN, 1870 : 103, by monotypy of *Wockia* HEINEMANN, 1870.

Unjustified emendation of *Wockia* HEINEMANN, 1870.

*W. funebrella* HEINEMANN, 1870, is currently considered to be a junior subjective synonym of *Patula asperipunctella* BRUAND, [1851] (RAGONOT 1895 : ccvi).

**Wockeia** SPULER, 1910 : 443.

Type-species : *Wockia funebrella* HEINEMANN, 1870 : 103, by monotypy of *Wockia* HEINEMANN, 1870.

Unjustified emendation of *Wockia* HEINEMANN, 1870.

*W. funebrella* HEINEMANN, 1870, is currently considered to be a junior subjective synonym of *Patula asperipunctella* BRUAND, [1851] (RAGONOT 1895 : ccvi).

**Wockia** HEINEMANN, 1870 : 102.

Type-species : *Wockia funebrella* HEINEMANN, 1870 : 103, by monotypy.

*W. funebrella* HEINEMANN, 1870, is currently considered to be a junior subjective synonym of *Patula asperipunctella* BRUAND, [1851] (RAGONOT 1895 : ccvi).

See also : *Patula* BRUAND, [1851], *Wockea* REUTTI, 1898 and *Wockeia* SPULER, 1910.

## 2. NOMINAL SPECIES

### 1. *amphilocha* MEYRICK

*Urodus amphilocha* MEYRICK, 1924 : 128  
Lectotype designated by CLARKE, 1965 : 399  
Type locality : Brazil, Santarem.

### 2. *aphanoptis* MEYRICK

*Urodus aphanoptis* MEYRICK, 1930 : 263  
Type locality : Brasil, Pará.

### 3. *aphrogama* MEYRICK

*Urodus aphrogama* MEYRICK, 1936 : 109  
Type locality : Brazil, Rio Grande do Sul.

### 4. *asperipunctella* BRUAND

*Patula asperipunctella* BRUAND, 1851 : 50  
*Wockia asperipunctella* (BRUAND) ; RAGONOT, 1895 : ccvi  
*Wockeia asperipunctella* (BRUAND) ; SPULER, 1910 : 443  
Type locality : France, environs of Besancon.

### 5. *auchmera* WALSINGHAM

*Urodus auchmera* WALSINGHAM, 1914 : 333  
Type locality : Guatemala, Baja Vera Paz, San Gerónimo.

### 6. *brachyanches* MEYRICK

*Urodus brachyanches* MEYRICK, 1931 : 89  
Type locality : Brazil, Guandu.

### 7. *calligera* ZELLER

*Trichostibas calligera* ZELLER, 1877 : 231  
*Urodus calligera* (ZELLER) ; HEPPNER, 1984 : 56  
Type locality : Cuba.

### 8. *capnodes* WALSINGHAM

*Anchimacheta capnodes* WALSINGHAM, 1914 : 324  
*Spiladarcha capnodes* (WALSINGHAM) ; MEYRICK, 1931 : 174  
Junior synonym of *Anchimacheta iodes* WALSINGHAM, 1914 (MEYRICK, 1931 : 174)  
Type locality : Mexico, Guerrero, Amula.

9. *carabopa* MEYRICK  
*Urodus carabopa* MEYRICK, 1925 : 129  
Lectotype designated by CLARKE 1965 : 399  
Type locality : Peru, Jurimaguas.
10. *chiquita* BUSCK  
*Trichostibas chiquita* BUSCK, 1910 : 529  
*Urodus chiquita* (BUSCK) ; WALSINGHAM, 1914 : 333  
Type locality : Costa Rica.
11. *chrysoconis* MEYRICK  
*Urodus chrysoconis* MEYRICK, 1932 : 285  
Type locality : Peru, Madre de Dios.
12. *costaricae* BUSCK  
*Trichostibas costaricae* BUSCK, 1910 : 529  
*Urodus costaricae* (BUSCK) ; WALSINGHAM, 1914 : 334  
Type locality : Costa Rica.
13. *cumulata* WALSINGHAM  
*Urodus cumulata* WALSINGHAM, 1914 : 334  
Type locality : Mexico, Vera Cruz.
14. *cyanombra* MEYRICK  
*Trichostibas cyanombra* MEYRICK, 1913 : 190  
*Urodus cyanombra* (MEYRICK) ; CLARKE, 1965 : 399  
Type locality : Argentina, Parana.
15. *cyclopica* MEYRICK  
*Urodus cyclopica* MEYRICK, 1930 : 262  
Type locality : Brazil, Pará.
16. *decens* MEYRICK  
*Urodus decens* MEYRICK, 1925 : 129  
Lectotype designated by CLARKE, 1965 : 400  
Type locality : Costa Rica, Orosi.
17. *derelicta* MEYRICK  
*Spiladarcha derelicta* MEYRICK, 1913 : 139  
Type locality : British Guiana, Mallali.
18. *distincta* STRAND  
*Trichostibas distincta* STRAND, 1911 : 241  
*Urodus distincta* (STRAND) ; WALSINGHAM, 1914 : 335  
Type locality : Panama, Volcan de Chiriqui.
19. *favigera* MEYRICK  
*Trichostibas favigera* MEYRICK, 1913 : 190

- Urodus favigera* (MEYRICK) ; CLARKE, 1965 : 400  
Type locality : Peru, Chanchamayo.
20. *fonteboae* STRAND  
*Trichostibas fonteboae* STRAND, 1911 : 240  
*Urodus fonteboae* (STRAND) ; HEPPNER, 1984 : 56  
Type locality : Brazil, Fonteboa.
21. *forficulella* WALSINGHAM  
*Paratiquadra forficulella* WALSINGHAM, 1897 : 116  
*Trichostibas forficulella* (WALSINGHAM) ; MEYRICK, 1914 : 35  
*Urodus forficulella* (WALSINGHAM) ; HEPPNER, 1984 : 56  
Type locality : Jamaica.
22. *fulminalis* MEYRICK  
*Urodus fulminalis* MEYRICK, 1931 : 90  
Type locality : Brazil, Minas Geraes, Serra Itatiaya.
23. *fumosa* ZELLER  
*Trichostibas fumosa* ZELLER, 1863 : 150  
*Urodus fumosa* (ZELLER) ; HEPPNER, 1984 : 56  
Type locality : Venezuela.
24. *funebrella* HEINEMANN  
*Wockia funebrella* HEINEMANN, 1870 : 103  
*Wockea funebrella* (HEINEMANN) ; REUTTI, 1898 : 291  
Junior synonym of *Patula asperipunctella* BRUAND, [1851] (RAGONOT, 1895 : ccvi)  
Type locality : Poland, Obernigk.
25. *hephaestiella* ZELLER  
*Trichostibas hephaestiella* ZELLER, 1877 : 230  
*Urodus hephaestiella* (ZELLER) ; WALSINGHAM, 1914 : 334  
Type locality : Panama, Volcan de Chiriqui.
26. *hexacentris* MEYRICK  
*Urodus hexacentris* MEYRICK, 1931 : 90  
Type locality : Brazil, Minas Geraes, Uberaba.
27. *hypsirates* MEYRICK  
*Urodus hypsirates* MEYRICK, 1925 : 130  
Type locality : Colombia, Paso del Quindiu.
28. *imitans* FELDER & ROGENHOFER  
*Trichostibas imitans* FELDER & ROGENHOFER, 1875 : pl. 139, fig. 27  
*Urodus imitans* (FELDER & ROGENHOFER) ; HEPPNER, 1984 : 56  
Type locality : Colombia.



29. *imitata* DRUCE  
*Urodus imitata* DRUCE, 1884 : 39  
Type locality : Guatemala, San Geronimi.
30. *iodes* WALSINGHAM  
*Anchimacheta iodes* WALSINGHAM, 1914 : 323  
*Spiladarcha iodes* (WALSINGHAM) ; MEYRICK, 1931 : 174  
Type locality : Mexico, Guerrero, Amula.
31. *iophlebia* ZELLER  
*Trichostibas iophlebia* ZELLER, 1877 : 228  
*Urodus iophlebia* (ZELLER) ; HEPPNER, 1984 : 56  
Type locality : Antillen.
32. *isoxesta* MEYRICK  
*Urodus isoxesta* MEYRICK, 1932 : 284  
Type locality : Bolivia, Corvico.
33. *isthmiella* BUSCK  
*Trichostibas isthmiella* BUSCK, 1910 : 528  
*Urodus isthmiella* (BUSCK) ; WALSINGHAM, 1914 : 334  
Type locality : Panama, Canal Zone, Gorgona.
34. *lissopeda* MEYRICK  
*Pygmoctrates lissopeda* MEYRICK, 1932 : 283  
*Urodus lissopeda* (MEYRICK) n. comb.  
Type locality : Brazil, Jaragua.
35. *lithophaea* MEYRICK  
*Trichostibas lithophaea* MEYRICK, 1913 : 140  
*Urodus lithophaea* (MEYRICK) ; HEPPNER, 1984 : 56  
Type locality : British Guiana, Bartica.
36. *marantica* WALSINGHAM  
*Urodus marantica* WALSINGHAM, 1914 : 333  
Type locality : Panama, Chiriqui.
37. *merida* STRAND  
*Trichostibas merida* STRAND, 1911 : 239  
*Urodus merida* (STRAND) ; HEPPNER, 1984 : 56  
Type locality : Venezuela, Merida.
38. *mirella* MÖSCHLER  
*Pexicnemidia mirella* MÖSCHLER, 1890 : 338  
*Urodus mirella* (MÖSCHLER) ; HEPPNER, 1984 : 56  
Type locality : Puerto Rico.

39. *modesta* DRUCE  
*Urodus modesta* DRUCE, 1884 : 39  
Type locality : Guatemala, Cerro Zunil.
40. *monura* HERRICH-SCHÄFFER  
*Urodus monura* HERRICH-SCHÄFFER, [1854] : wrapper, pl. 42, fig. 219  
Type locality : Venezuela.
41. *niphatma* MEYRICK  
*Urodus niphatma* MEYRICK, 1925 : 130  
Type locality : Colombia, Mt. Tolima.
42. *opticosema* MEYRICK  
*Urodus opticosema* MEYRICK, 1930 : 262  
Type locality : Brazil, Pará.
43. *ovata* ZELLER  
*Trichostibas ovata* ZELLER, 1877 : 233  
*Urodus ovata* (ZELLER) ; HEPPNER, 1984 : 56  
Type locality : Cuba.
44. *pallidicostella* WALSINGHAM  
*Trichostibas pallidicostella* WALSINGHAM, 1897 : 115  
*Urodus pallidicostella* (WALSINGHAM) ; HEPPNER, 1984 : 56  
Type locality : Jamaica.
45. *pamporphyra* MEYRICK  
*Urodus pamporphyra* MEYRICK, 1936 : 108  
Type locality : Brazil, Rio Grande do Sul.
46. *parvula* EDWARDS  
*Penthetria parvula* EDWARDS, 1881 : 80  
*Trichostibas parvula* (EDWARDS) ; DYAR, 1898 : 41  
*Urodus parvula* (EDWARDS) ; FORBES, 1923 : 340.  
Valid name of *calligera* auct. not ZELLER 1877 (BUSCK, 1910 : 527)  
Type locality : Florida.
47. *perischias* MEYRICK  
*Urodus perischias* MEYRICK, 1925 : 129  
Type locality : Brazil, Teffé.
48. *porphyrina* MEYRICK  
*Urodus porphyrina* MEYRICK, 1932 : 284  
Type locality : Colombia ; Costa Rica.
49. *praetextata* MEYRICK  
*Trichostibas praetextata* MEYRICK, 1913 : 140

- Urodus praetextata* (MEYRICK) ; HEPPNER, 1984 : 56  
Type locality : Peru, Pacaya.
50. *procridias* MEYRICK  
*Urodus procridias* MEYRICK, 1936 : 108  
Type locality : Brazil, Rio Grande do Sul.
51. *pulvinata* MEYRICK  
*Urodus pulvinata* MEYRICK, 1924 : 128  
Type locality : Peru, Rio Napo.
52. *sanctipaulensis* STRAND  
*Trichostibas sanctipaulensis* STRAND, 1911 : 240  
*Urodus sanctipaulensis* (STRAND) ; HEPPNER, 1984 : 56  
Type locality : Brazil, Amazonas, Sao Paulo.
53. *scythrochalca* MEYRICK  
*Urodus scythrochalca* MEYRICK, 1932 : 285  
Type locality : Costa Rica, Orosi.
54. *sordidata* ZELLER  
*Trichostibas sordidata* ZELLER, 1877 : 233  
*Urodus sordidata* (ZELLER) ; HEPPNER, 1984 : 56  
Type locality : Puerto Rico.
55. *spumescens* MEYRICK  
*Urodus spumescens* MEYRICK, 1925 : 131  
Type locality : Peru, Oconeque, Carabaya.
56. *staphylina* MEYRICK  
*Urodus staphylina* MEYRICK, 1932 : 284  
Type locality : Brazil, Jaragua.
57. *sympiestis* MEYRICK  
*Urodus sympiestis* MEYRICK, 1925 : 129  
Lectotype designated by CLARKE, 1965 : 403  
Type locality : Brazil, Teffè.
58. *tolmetes* WALSINGHAM  
*Anchimacheta tolmetes* WALSINGHAM, 1914 : 324  
*Spiladarcha tolmetes* (WALSINGHAM) ; MEYRICK, 1931 : 174  
Junior synonym of *Anchimacheta iodes* WALSINGHAM, 1914 (MEYRICK, 1931 : 174)  
Type locality : Mexico, Guerrero, Amula.
59. *transverseguttata* ZELLER  
*Trichostibas transverseguttata* ZELLER, 1877 : 229

*Urodus transversiguttata* [sic] WALSINGHAM, 1914 : 335

Type locality : Panama, Chiriqui.

60. *triancycla* MEYRICK

*Urodus triancycla* MEYRICK, 1931 : 89

Type locality : Paraguay, San Bernardino.

61. *venatella* BUSCK

*Trichostibas venatella* BUSCK, 1910 : 530

*Urodus venatella* (BUSCK) ; HEPPNER, 1984 : 56

Type locality : Brazil, Parana, Castro.

62. *xiphura* MEYRICK

*Urodus xiphura* MEYRICK, 1931 : 90

Type locality : Brazil, Santa Catharina, Jaragua.

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### References

- BROWN, R., 1895. [Communication]. *Annls Soc. ent. Fr.* 63 (Bull.) : ccv-ccvi.
- BRUAND, T., [1851] 1850. Catalogue systématique et synonymique des Lépidoptères du Département du Doubs. Tineides. *Mém. Soc. emul. Doubs* (1) 3 (3) : 23-58.
- BUSCK, A., 1910. New moths of the genus *Trichostibas*. *Proc. U.S. Nat. Mus.* 38 : 527-530, pl. 35.
- CHRÉTIEN, P., 1905. Le genre *Artenacia* et les genres des Hyponomeutinae. *Le Naturaliste* (2) 433 : 65-67.
- CLARKE, J. F. G., 1965. Catalogue of the type specimens of Microlepidoptera in the British Museum (Natural History) described by Edward MEYRICK, Vol. 5, 581 pp. London.
- COMMON, I. F. B., 1970. Lepidoptera, pp. 765-866. In Mackerras (ed.), *The Insects of Australia*, 1029 pp., 8 pls. Canberra.
- DRUCE, H., 1881-1900. Lepidoptera-Heterocera, Vols. 1-3. In GODMAN, F. D. & SALVIN, O. (eds.) *Biologia Centrali-Americana. Zoology : Insecta*. Vol. 1 (1881-1891) : 490 pp., vol. 2 (1891-1900) : 622 pp., vol. 3 : pls. 1-101. London.
- DYAR, H. G., 1898. New North American moths and synonymical notes. *J.N.Y. ent. Soc.* 6 : 41.

- EDWARDS, H., 1881. A new genus and some new forms of North American *Zygaenidae*. *Papilio* 1 : 80.
- FELDER, R. & ROGENHOFFER, A. F., 1875. Reise der österreichischen Fregatte Novara um die Erde... Zoologischer Teil, 2 (2), Heft 5, 20 pp., pls. 108-140, Vienna.
- FORBES, W. T. M., 1923. The Lepidoptera of New York and neighboring states. Primitive forms, Microlepidoptera, pyraloids, bombyces. *Mem. Cornell Univ. Agric. Exp. Sta.* 68 : 1-789.
- FROST, S. W., 1972. Notes on *Urodus parvula* (Henry EDWARDS) (Yponomeutidae). *J. Lepid. Soc.* 26 : 173-177.
- GUSTAFSSON, B., 1980. Förteckning över Sveriges småfjärilar. 2. uppl., 71 pp., Stockholm.
- HEINEMANN, H., 1870. Die Schmetterlinge Deutschlands und der Schweiz. 2. Kleinschmetterlinge 2 (1). 388 pp., Braunschweig.
- HEPPNER, J. B., 1982. Millieriinae, a new subfamily of Choreutidae, with new taxa from Chile and the United States (Lepidoptera : Sesiioidea). *Smithson. Contr. Zool.* 370 : 1-27.
- HEPPNER, J. B., 1984. Atlas of Neotropical Lepidoptera. Checklist : Part 1, Micropterigoidea-Immoidea. xxvii + 112 pp. The Hague.
- HEPPNER, J. B. & DUCKWORTH, W. D., 1983. Yponomeutidae, pp. 26-27 in HODGES, R. W. *et al.*, Check list of the Lepidoptera of America north of Mexico, 284 pp., Faringdon & Washington.
- HERRICH-SCHÄFFER, G. A. W., 1850-1858. Sammlung neuer oder wenig bekannter aussereuropäischer Schmetterlinge. Vol. 1. 84 pp., 96 + 24 pls., Regensburg.
- KIRBY, W. F., 1892. A synonymic Catalogue of Lepidoptera Heterocera. (Moths), Vol. 1. Sphinges and Bombyces. xii + 951 pp., London.
- KLIMESCH, J., 1961. Ordnung Lepidoptera, I Teil : Pyralidina, Tortricina, Tineina, Eriocraniina und Micropterygina. pp. 481-788 in FRANZ, H. (ed.) Die Nordost-Alpen im Spiegel ihrer Landtierwelt. Eine Gebietsmonographie. Band 2. 792 pp., Innsbruck.
- KROGERUS, H., 1943. Ett bidrag till kännedomen om fjärilfaunan i Östkarelen. *Not. Ent.* 23 : 43-48.
- KUUSIK, A., 1962. Märkmeid Eesti pisiliblikatest. *Faunistilisi märkmeid* 1 (5) : 228-235.
- KYRKI, J., 1978. Suomen pikkuperhosten levinneisyys. I. Luonnontieteellisten maakuntien lajisto (Lepidoptera : Micropterigidae-Pterophoridae). *Not. Ent.* 58 : 37-67.
- KYRKI, J., 1984. The Yponomeutoidea : a reassessment of the superfamily and its suprageneric groups (Lepidoptera). *Ent. scand.* 15 : 71-84.
- LERAUT, P., 1980. Liste systématique et synonymique des lépidoptères de France, Belgique et Corse. *Alexanor & Bull. Soc. ent. Fr.*, Suppl. : 1-334.
- MEYRICK, E., 1913. Pp. 65-176 in MEYRICK, E., Exotic Microlepidoptera, vol. 1 (1912-1916), 640 pp., London.
- MEYRICK, E., 1914. Hyponomeutidae, Plutellidae, Amphitheridae. *Lepid. Cat.* 19 : 1-64.
- MEYRICK, E., 1924, 1925. Pp. 65-128 and 129-224 in MEYRICK, E. Exotic Microlepidoptera, vol. 3 (1923-1930), 640 pp., London.



- MEYRICK, E., 1930 : Ergebnisse einer zoologischen Sammelreise nach Brasilien, insbesondere in das Amazonasgebiet ausgeführt von Dr. H. ZERNY. V. Teil : Microlepidoptera. *Annln naturh. Mus. Wien* 44 : 223-268.
- MEYRICK, E., 1931, 1932. Pp. 33-192 and 193-352 in MEYRICK, E. Exotic Microlepidoptera, vol. 4 (1930-1936). 642 pp. London.
- MEYRICK, E., 1936. New species of Pyrales and Microlepidoptera from the Deutsches Entomologisches Institut. *Arb. morph. taxon. Ent. Berl.* 3 : 94-109.
- MINET, J., 1983. Étude morphologique et phylogénétique des organes tympaniques des Pyraloidea. 1 — Généralités et homologies. (Lep. Glossata). *Annls Soc. ent. Fr. (N.S.)* 19 : 175-207.
- MÖSCHLER, H. B., 1890 : Die Lepidopteren-Fauna der Insel Portorico. *Abh. Senckenberg. naturf. Ges.* 16 : 69-360.
- MOSHER, E., 1916. A classification of the Lepidoptera based on the characters of the pupa. *Bull. Ill. St. Lab. nat. Hist.* 12 : 17-159.
- ORSTADIUS, E., 1932. Anmärkningsvärda fynd av småfjärilar. *Ent. tidskr.* 53 : 108-113.
- RAGONOT, E.-L., 1895. [Communication]. *Annls. Soc. ent. Fr.* 63 (Bull.) : ccvii-ccviii.
- REUTTI, C., 1898. Übersicht der Lepidopteren-Fauna des Grossherzogtums Baden (und der anstossenden Länder). 2. Ausg., *Verh. naturw. Ver. Karlsruhe* 12 : i-xii, 1-361.
- SATTLER, K., 1967. Microlepidoptera palaeartica. 2. Ethmiidae, xvi + 185 pp., 106 pls., Wien.
- SPULER, A., 1903-1910. Die Schmetterlinge Europas. 2. 523 pp., Stuttgart.
- STRAND, E., 1911. Notes on the cocoons and descriptions of four new species of the genus *Trichostibas*. *Ann. Mag. Nat. Hist.* (8) 7 : 237-241.
- ŠULCS, A. & ŠULCS, I., 1978. Neue und wenig bekannte Arten der Lepidopteren-Fauna Lettlands. 7. Mitteilung. *Not. Ent.* 58 : 141-150.
- SVENSSON, I., 1982. Anmärkningsvärda fynd av Microlepidoptera i Sverige 1981. *Ent. tidskr.* 103 : 81-88.
- WALSINGHAM, Lord, 1897. Revision of the West-Indian Micro-Lepidoptera, with descriptions of new species. *Proc. zool. Soc. Lond.* 1897 : 54-183.
- WALSINGHAM, Lord, 1909-1915. Lepidoptera Heterocera, vol. 4 : Tineina, Pterophorina, Orneodina, Pyralidina and Hepialina, 482 pp., 9 pls, in GODMAN, F. D. & SALVIN, O. (eds.), *Biologia Centrali Americana. Zoology : Insecta*. London.
- WERNER, K., 1958. Die Larvalsystematik einiger Kleinschmetterlingsfamilien (Hypnometridae, Orthoteliidae, Acrolepiidae, Tineidae, Incurvariidae und Adelidae). *Abh. Larvalsyst. Insekten* 2 : 1-145.
- ZAGULAJEV, A. K., 1981. 30. Sem. Plutellidae — Serpokrilye moli, pp. 359-397 in FALKOVITS, M. I. & MEDVEDEV, G. S. (eds.), *Opredelitel nasekomyh evropejskoj časti SSSR. 4. Česuekrylye. 2.* 788 pp., Leningrad.
- ZELLER, P. C., 1863. Zwölf amerikanische Nachtfalter. *Ent. Ztg. Stettin* 24 : 136-155.
- ZELLER, P. C., 1877. Exotische Microlepidoptera. *Horae Soc. ent. ross.* 13 : 3-493.
- ZIMMERMAN, E. C., 1978. Insects of Hawaii, Vol. 9 Microlepidoptera 1-2. 1902 pp. Honolulu.